Social Interaction: Do Non-humans Count?

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Abstract

A growing body of research suggests that non-humans play a central role in many social interactions – not simply as objects used by humans as interaction props, but as fully participating agents of action. In this essay, I examine these innovative ideas, reviewing survey data that documents this trend and theoretical and empirical work that seeks to better understand it.

Introduction

Right now, a relative, friend, or neighbor is hugging their pet and telling a pollster that the animal is as important to them as their parents, spouse, or child. Somewhere near you, someone you know is talking to their guardian angel or conversing with a deceased loved one–either directly or via a psychic like John Edward, James Van Praugh, or Silvia Brown. At a nearby nursing home, a 'smart robot' such as Paro is forming deep emotional bonds with residents and providing documented healing effects such as reducing stress or improving depression levels. And just a few clicks away in a virtual world like *Second Life*, someone has just spent hundreds, perhaps thousands of dollars to buy their onscreen 'avatar' a shorefront home, a Ferrari or a better set of abs.

Animals, deities, the dead, robots, avatars: do these entities have a place in sociological analysis? A growing body of research suggests that such entities play a central role in many social interactions – not simply as objects used by humans as interaction props, but as fully participating agents of action. In this essay, I examine these innovative ideas, reviewing survey data that documents this trend and theoretical and empirical work that seeks to better understand it.

Just who or what are we talking about?

Historically and worldwide, non-humans have been important to people's social relationships. But social scientists of earlier eras showed little interest in comprehensively surveying or studying attitudes and behaviors toward such entities. In the past quarter century, however, interests have changed. Social scientists are now asking questions about how people envision and interpret non-humans in interactive settings.

Pets

Surveys show that the majority of Americans see their pets as legitimate participants in social interaction. Two important nationwide polls, for example, show that 86 percent of respondents identified their animals as full-fledged members of the family – with 50 percent classifying their pets as equal in importance to other family members (Petside.com 2009; Pew Foundation 2006). Another more specialized survey showed that 30 percent of respondents

believe that pets 'count' as full fledged family members, while gay couples do not enjoy such status (Powell et al. 2010). Further, many Americans report intimate bonds with their pets that are stronger than those developed with friends and family members. Dog owners report feeling closer to their pets than to their mothers (94 vs. 87 percent), and both dog and cat owners report feeling closer to their pets than their fathers (94 and 84 percent vs. 74 percent; Pew Foundation 2006). Pets are so critical to family interactions that 68 percent of pet own-ers will not leave home without them, a fact rapidly causing many hotels, restaurants and service businesses to reconsider their 'no pet' policies (Hoevel 2006; Petside.com 2009) and rescue units to rethink disaster preparation plans (Zottarelli 2010). The strength of these human–pet bonds leads 60 percent of Americans to believe that they will or may reunite with their pets in heaven (Sussman 2007).

Increasingly, these feelings of intimacy translate to economic action. Data on spending show that purchases for pets can mirror those made for human friends and family mem-bers. In 2010, Americans spent 47.7 billion dollars on their pets, triple the amount spent

Figure 1. Pets with Style.

in 1995. But those dollars went far beyond 'caretaking' factors such as food, water, medical care or supervision. Spending covered things typically reserved for human social activities – i.e. fashion, (43 percent of pet owners said their pets had a unique sense of style – see Figure 1), furniture, psychotherapy, health insurance, spa days, playgroups, designer pet homes, vacations, and pet 'translators' (American Pet Products Association (APPA) (2011); Petside.com 2009).

Deities and demons

According to Gallup polls, roughly 80 percent of Americans believe that deities, saints, and angels are among us performing miracles. About 70 percent of Americans believe in a demonic presence; and 79 percent believe that all life forms have a soul that lives on for–ever (Newport 2007; Pew Forum on Religion and Public Life 2009). More importantly,

Figure 2.   Guardian Angel.

Americans feelings on these matters move well beyond the abstract. About 45 percent of Americans say they have spoken to God or another heavenly being and about 55 percent say they have encountered their Guardian angel and/or maintain regularly contact – see Figure 2 (Stark 2008). These experiences render all of these entities viable social interactants.

Research on prayer may shed some light on how such beliefs translate to action. Studies show that those who pray to deities or spiritual entities (i.e. God, Allah, Jesus, saints, angels, etc.) treat the exchange in ways similar to those that characterize human-to-human interactions. Prayer, like other micro-interactions, is heavily influenced by a human's perception of their co-interactant's orientation, capabilities, and inclinations (Barrett 2004; Barrett and Keil 1996; Bender 2008; Gibbon 2008; MacDonald 1995; Orsi 2004; Stark 1999; Wuthnow 1998, 2007, 2008). Consider, for instance, the socially patterned ways in which individuals choose the targets of their prayers. Cerulo and Barra (2008) found that individuals are not content to let religious doctrine dictate those to who whom they pray. Here, as in other social interactions, individuals choose co-interactants that are socially similar to themselves. Thus, high-power executives choose to interact with supreme authorities like God or Allah. Service-workers (e.g. ministers, nurses) choose human-like entities such as Jesus or the saints. Individuals also pray to those that they believe command the resources best adapted to the task at hand. The study's respondents petitioned supreme beings like God or Allah for large scale problems such as world peace or recovery from natural disasters. In contrast, respondents targeted anthropomorphized entities (Jesus, the Saints, etc.) for human trials such as loneliness or fear. And individuals prefer to pray to entities with whom they perceive a long-term relationship. In this regard, Cerulo and Barra found a very strong association between one's choice of a favorite prayer target and one's perception of the frequency with which that target responds.

The dead

One-third of Americans believe that ghosts and spirits inhabit the earth. Among those under age 29, that figure increases to 45 percent (Lyons 2005). Further, 29 percent of Americans are certain they can communicate meaningfully with the dead (Pew Forum on Religion and Public Life 2009).

These beliefs are not necessarily new; but studying them via surveys is. In recent years, researchers have also begun probing the ways in which such beliefs translate to behavior. For example, data from the 'Changing Lives of Older Couples' study, a Detroit-based study of spousal bereavement among older adults, shows that 40 percent of respondents reported sensing the presence of their deceased spouse, and 18 percent reported actually hearing the spouse making sounds in their homes. (Moore 2005 notes among the general population, these figures are 32 and 20 percent respectively.) The data also show that those reporting such connections exhibited different behavior patterns than those that did not. Those interacting with the dead were more likely than others to consider their deceased spouses in decision making (69 vs. 49 percent), to frequent places that were special to them and their spouse (60 vs. 45 percent), and to pursue a strong relationship with God (83 vs. 68 percent). These individuals were also less likely than others to feel lonely most of the time (16 vs. 22 percent) or empty inside (10 vs. 18 percent). (See also Bonanno et al. 2002, 2004; Carr et al. 2006.)

Those studying juvenile delinquents report similar findings. Popenoe (1996) contrasts the role of deceased parents to that of parents absent due to divorce or desertion. He explains,

a dead father is typically a more effective father than one who is missing. When a father dies, his favorable reputation is still maintained; his picture still hangs on the wall; he is still a positive presence, a force, even an arbiter (152).

As a result, children of deceased fathers tend to have higher self esteem and fewer behavioral problems than children who lose fathers via divorce or abandonment. (See also Bendiksen and Fulton 1975; Berlinsky and Biller 1984; Biblarz and Gregg 2000; Klass 1992; Pardo 1996; Sigle-Rushton and McLanahan 2004; Tennant 1988.)

Robots and avatars

Studying robots and avatars as legitimate interactants is a new but burgeoning field. In 2004, the global robotics market was estimated at about $17.3 billion dollars and it is projected to reach $21.4 billion dollars by 2014. While about two-thirds of these robots were industrial in 2004, by 2014 it is expected that roughly 70 percent will be domestic and professional service robots ranging from cleaning tools (e.g. the *Roomba* vacuum) to simple toys (e.g. Sony's *Aibo* dog or WowWee's *Robosapien*) to sophisticated smart robots and computers (e.g. AIST's *Paro* IBM's *Watson,* or Honda's *Asimo*) and humanlike 'actroids' (e.g. Kokoru's *Sarah*) (World Robotics 2010). Avatars are even more popular than robots. (An avatar is a graphic image that represents a person on a computer or Internet site – see Figure 3 for an example.) In 2008, roughly 100 million people created avatar residents in online worlds such as *Second Life, There*, and game based worlds like *EverQuest*. Surveys show that these users spend over five billion dollars annually on their avatars, purchasing online homes, furnishings, businesses, and personal services for them (Macmillan 2007). Some estimates suggest that by 2012, these figures will more than double (Alter 2007).

Some scholars have done ethnographic studies of avatar communities, treating them as cultural worlds akin to those studied by Malinowski, Meade, or Goffman. These works document the norms, practices, and values that guide avatar communities (Boellstorff 2008; Guest 2007; Schroeder 2002; Webb 2001). They also study the economics of these worlds, examining the asset value of different avatar bodies, issues of avatar design, intellectual property, and norms of economic exchange (Castronova 2004; Klang 2004; Kollock 1999). But in terms of survey data on social interaction, Nick Yee of the Palo Alto Research Center (PARC) leads the way. Yee (2006) spent 3 years surveying 30,000 users of Massively Multi-User Online Role-Playing Games (MMORPGs). His data tell us much about how individuals perceive their online interactions. Yee's data show that human–avatar interactions, while recognized as objectively different from human-to-human interactions, are nevertheless viewed as legitimate social relationships. In his survey, 39 percent of men and 53 percent of women said their friendships with avatars were comparable to or better than those maintained with co-present humans. Indeed, almost a quarter of Yee's respondents identified these human–avatar interactions as the emotional highlight of their past month's experiences. Yee also found demographic differences in human–avatar interactions – differences that mirrored patterns found in human-to-human relationships. For example, different things motivated men and women to participate in human-to-avatar interactions. Women's relationships were motivated by a desire for social intimacy while men sought task-oriented partners with whom they might achieve socially instrumental goals. Ethnicity also plays a role here. For example, those in Asian countries are most likely to deal in pre-defined character appearances while

Figure 3. Second Life Avatar.

Westerners heavily customize their avatars' physical appearance. Yee traces this difference not, as one might expect, to different cultural emphases on community versus individual-ism, but to different views on egalitarianism. Asian systems tend to be designed in ways that level the design playing field while Western systems give an advantage to those with the most sophisticated design resources.

Are non-humans actors or just projections?

In early explorations on non-human interactants, some, (primarily symbolic interaction-ists), argued that humans simply project mind onto non-humans, seemingly endowing them with human capacities. This process allows humans to legitimate non-humans as viable 'others' in social interaction. In this regard, Weinberg (1997) studied the ways in which the mentally ill animated non-human objects in their social space. By projecting

human capacities onto the objects, these individuals felt able to interact with the objects as they would with other humans. Sanders (1993) dissected the projection process by observing dog owners in veterinary clinics. He itemized the specific qualities that humans projected on their pets and the strategies they used to do so. Pollner and McDonald-Wikler (1985) offered similar information, examining the strategies used by family members to project mental and social competence onto their severely retarded children.

In recent years, some symbolic interactionists have moved beyond notions of projection. Owens (2007) introduced the idea of 'doing mind', a process that enables meaningful human–non-human interaction (Owens 2007).[2] In unpacking this concept, Owen contends that doing mind involves both 'constructing and forgetting'. She writes,

> I must take the position that this [nonhuman] other exists and acts independently of myself. If I recognize that the object is not other except in my own perception, I am chasing my own tail … I must take the role of the other that is actually and only myself and treat this other's portion of the exchange as a unique contribution (2007, 577).

Doing mind is not a constant feature of human–non-human encounters. According to Owens, the phenomenon occurs only under certain conditions. First, she contends that potential non-human interactants must appear capable of action that is independent of direct human manipulation. Thus your dog may seem like a legitimate co-interactant while your pet rock may not. Second, Owens argues that humans must experience non-humans' capacity for independent action under conditions that threaten humans' ability to achieve their desired goals. In other words, something is stopping you from 'doing it yourself'. Finally, humans must experience a certain level of urgency, making their interaction with non-humans necessary to goal achievement. This means we consider interacting with non-humans only in the face of pressing circumstances or emergencies.

At present, one can find symbolic interactionists applying this general view in a variety of substantive areas. For example, those studying the environment and environmental disasters often treat elements of the environment − land and sea, wind and water, the built environment, etc. − as legitimate interactants (see e.g. Smith and Bugni 2006; Vannini 2008; Weigert 2008). This approach is also prolifically applied by those exploring human–animal intersubjectivity. Alger (2003); Arluke and Sanders (1996); Irvine (2004a,b); Jerolmack (2010); Myers (2003); Sanders (2003, 2006); and Wilkie (2005) are among those who use various sites − the home, shelters, testing labs, and workplaces − to address the ways in which humans and animals jointly construct and deconstruct interspecies boundaries. They also examine the ways in which humans and animals read one another's gestures, and negotiate a social and cultural order that facilitates both intra and inter species interaction.

Relational approaches to human–non-human interaction

Some scholars use a relational lens to study non-humans' role in interaction. Actor-Network theory (ANT) stands at the forefront of this inquiry, with theorists considering non-humans as integral part of broader social networks.

The ANT project begins by re-defining the social. For these theorists, the social consists of patterned networks of heterogeneous materials called 'actants' (Callon 1987, 93; Latour 1988, 1997, 2005; Law 1987, 111). Actants connect, forming alliances and associations that result in an 'actor-network'.

The theory's next step comes in re-conceptualizing social interaction. To understand the reformulation, we must further elaborate the concept of an actant. In ANT, an actant

is any independent entity that, at any time, can acquire the ability to make things happen within the actor-network. The actant need not express intention; it need not experience consciousness or reflect on its action. Indeed, the things an actant makes happen may not involve any of the special capabilities typically tied to humanness. It is the initiation of the action–reaction chain that is key in ANT, not the motivations behind action. Thus your doorbell, while typically defined as an object or prop in other theories, becomes an actant in ANT. This is because the doorbell, once it rings, engages you; it requires you to answer or ignore it, to make a decision and respond. This idea is important, for it means that actants are not defined simply by what they are – human versus non-human. Rather, actants are defined by what they do and with, through, or about whom or what they interact. In this way, actants can be human; they can be collectives such as groups and organizations. But actants can also include non-human entities such as animals, objects, (i.e. machines, computers, clothing, money), text and other symbols, or mental concepts (i.e. memories, projections, ideas). ''An actant can literally be anything provided it is granted to be the source of an action'' (Latour 1997, 2005).

But how can non-human entities, particularly inanimate objects – be the source of action? Callon (1986) contends that this happens when a set of key actants – what he calls 'focal actants' – initiate a four-stage process called 'translation'. In stage one of translation, focal actants in the network execute three tasks: they negotiate and define the problem at hand, they identify the actants (human and non-human) that are relevant to its solution, and they make themselves indispensable to all solution-oriented strategies. In stage two, focal actants work to diffuse through the network the issues, actants, and strategies just articulated; they also work to makes these things acceptable to the rest of the network. Stage three involves the creation of stable alliances built around the newly defined reality. In the final stage of translation, network consensus ensues around the newly defined real-ity. The network moves beyond acceptance and toward enactment. When the process of translation is complete, human and non-human alike become interlocking units – parts that, together, form a coherent whole. From that point forward, one's legitimacy in social interaction derives from relationships – from actants' doing in concert, from their results, from their connections and their functional positions in the network. One is an actant – human or non-human – if one contributes to the form and function of the network.

This approach is somewhat different from the symbolic interactionism ideas just reviewed. But the outcome of this thinking is at once similar yet more wide reaching. (For example, Owen's qualifications for human–non-human interaction are absent in ANT.) In ANT, non-humans are something much more than props. Animals, objects, texts, cogni-tive images, etc. mediate interaction in ways as significant as those of humans. Thus, when scientists study the contents of a test tube or observe a cell through a microscope, when writers link to the works produced by their predecessors, when manufacturers create and disperse goods that are adopted by members of their communities, the observer and the observed, the product and its users, form connections that function as critical parts of the network. In these scenarios, not all members of the network are conscious or intentional, not all have a sense of self; but all beckon or preclude interaction. All members – human and non-human – can make things happen (Law 1992). As Latour describes it,

> No actant is so weak that it cannot enlist another Then the two join together and become one for a third actant, which they can therefore move more easily. An eddy is formed, and it grows by becoming many others (1988, 150).

In recent years, interesting empirical research has grown from ANT. William-Jones and Graham (2003) for example, use the theory to explore social, ethical, and policy issues

involved in commercial genetic testing – specifically, controversies surrounding the case of Myriad Genetics and the BRACAnalysis test. As one might expect, the researchers treat scientists, executives, and government officials as 'actants' in the case. But they treat the genetic test and resulting patents as actants as well. According to Williams-Jones and Graham, these tests and patents are not passive; they elicit responses and generate effects on both consumers and public policy. Further, in dealing with genetic testing, scientists, executives, and government officials interact with, through, and about the tests and patents. Thus it is critical that we treat these non-human elements as legitimate interactants. Doing so increases the scope of the network we study and enhances our understanding of inter-relational interests. In another study, Dant (2004) uses ANT to examine the development of the 'driver-car' – a social being that results from a collaboration between human and machine. Similar to Haraway's 'cyborg' (1985, 1991), something she defined as a human–animal or human–machine hybrid, Dant argues that this 'assemblage' has itself introduced new forms of social interaction to society including driving, parking, transporting, polluting, etc. Because these new forms of interaction have had significant effects on societal development and have actually altered the meaning of social fields, Dant contends that the driver-car must be viewed as a legitimate participant in social interaction and hence an important subject for sociological study. Finally, Gomart and Hennion (1999) use ANT to study addiction. Considering both positive addictions (love of music) and negative addictions (love of drugs), their study shows that 'users' can be "seized by objects of their passions … passing between active and passive … between 'I manipulate' and 'I am manipulated'." The authors argue that in this relationship – this moment of passion – the subject and object are equally important actants. Both contribute to social interaction, and thus, must be included as equal players in the sociological analysis of addiction. (See Akrich 1992; Hetherington 1999; Mol 1998; Singleton 1998; Turner 2005; Valverde 2005 for additional ANT applications.)

   Like any radical theory, ANT has its critics. Some reject the symmetry between human and non-humans, arguing that human qualities (e.g. intention, reflexiveness, and morality) must be viewed as precursors to all interaction (Hacking 1999a,b; Jones 1996; Lee and Brown 1994; Murdoch 2001). This proves true even for those who accept the idea of material agency (Knappett 2002; Knappett and Malafouris 2008; Pickering 1992, 1993). However, ANT proponents do not concede the point; non-humans belong in our analytic lens for two reasons. First, qualities such as intention, reflexiveness, and morality emerge from the network relationships and not from actants themselves (Breslau 2000). Second, humans and non-humans need not be treated identically in all situations but only insofar as they contribute to the description of a network (William-Jones and Graham 2003). Others have argued that ANT provides thick descriptions of networks while ignoring the social and political aspects of interactive contexts (Collins and Yearly 1992; Fuller 2000; Star and Lawe 1991; Sturman 2006). ANT proponents oppose this idea as well, arguing that the thick description offered via ANT

> destabilizes the dominant stories and ideologies. By unpacking that which has been simplified or buried, a rich complex empirical understanding of a case develops that enables sustained social and ethical critique (William-Jones and Graham 2003).

And then there's technology

Technology has always played an important role in considerations of non–human interactants. But in the past, social theorists were most concerned with the potential of

machines to merge with human bodies and minds. In this regard, McLuhan (1964) approached technology as something that extended the human nervous system. Years later, Haraway (1985, 1991) wrote of the cyborg society, arguing that the relationship between people and technology had become so close, so intimate, that it was no longer possible to tell where human beings ended and machines began. Most recently, Tenner (2003) reflected on the unintended consequences of mundane technologies such as helmets, shoes, and eyeglasses, reviewing the unexpected ways in which these objects change both the way our bodies look as well as what we can or cannot do with them.

Work on new communication technologies (NCT) poses a somewhat different set of issues. Such scholars probe not mergers but exchange between two distinct agents. The work is especially important for any review on non-human interactants. 'Smart' computers, avatars, and robots are 'bred' for social interaction, and thus, can more effectively combat the 'human only' assumptions so common to much sociological dialog on the subject. In this way, NCT redefine definition and boundaries of social interaction, and thus, beckons considerations of *all* non-humans' interactive capacities.

Cliff Nass and his colleagues provide important insight into social interaction between humans and computers, robots, and avatars (Nass and Brave 2005; Reeves and Nass 1996). Nass finds that the increased communicative capacities of these techno–objects have had notable effects on people's perceptions of the 'other'. Nass argues that certain types of objects evoke a sense of inter-subjectivity in humans, encouraging individuals to respond to such entities in fundamentally social ways.

Over the years, Nass and associates have revisited a number of classic social psychological experiments – experiments that were designed to test person–to–person responses in social interaction. In updating the experiments, the researchers made one critical change. Now, the experiments tested person–to–computer, robot or avatar responses. Results showed that people – even the most technologically sophisticated people – interacted with these entities just as they interacted with humans. Subjects were polite to computers, robots, and avatars; they responded to praise from them, and they viewed them as teammates (Fogg and Nass 1997; Mayer et al. 2006; Nass et al. 1995, 1996; Tzeng 2004). Subjects liked computers, robots, and avatars with personalities or social characteristics similar to their own (Al-Natour et al. 2006; Mayer et al. 2003; Nass and Moon 2000; Nass et al. 1999). They trusted computers, robots, and avatars that manifested caring orientations more than those that did not (Brave et al. 2005; Lee et al. 2005, 2007; Pertaub et al. 2002). They found masculine-sounding computers, robots, and avatars extroverted, driven, and intelligent while they judged feminine-sounding computers, robots, and avatars knowledgeable about love and relationships (Nass and Moon 2000; Nass et al. 1997a). They even altered their body posture and mood according to the size and perspective of the screen images before them (Reeves and Nass 1996). In essence, new technologies endowed these objects with critical interactive and communicative capacities, encouraging humans to perceive and react to these entities as legitimate partners in social interaction. (See also Carley and Newell 1994; Cassell and Tartaro 2007; Holtgraves et al. 2007; McDonald and Kim 2001; Moon 2000; Nass and Steuer 1993; Nass et al. 1994, 1997a,b; Payr 2001).

Sherry Turkle reported similar results in her studies of human–robot interactions. Turkle studied a special type of smart robot – those that could recognize their owners, obey their commands, and adjust their personalities in accord with their owners' speech and actions. (*AIBO, My Real Baby, Furby, Paro, Cog, iCat,* and *Healing Partners* were among

those that met her criteria.) Turkle did extensive observations of both the elderly and children as they interacted with these robots. She found that subjects responded to the robots in unmistakably social ways. Among the elderly, interacting with robots brought a sense of true companionship; such interactions also lessened anxiety in those suffering from dementia. Children perceived and related to robots as 'autonomous and almost alive selves'. And while the children clearly understood that the robots were not human – an ability Boyer (1996) tells us develops in infancy – the children also identified the robots as fully capable of a meaningful social relationship (Turkle 2011). Turkle explains the responses by noting these robots entities actively engage humans' emotions. ''[The robots] seduce us by asking for human nurturance, not intelligence. We're suckers not for realism *but for relationships*'' (quoted in Allis 2004). (See also Bernstein et al. 2007; Breazeal 2002, 2003; Fell-Seifer et al. 2007; Kumar and Benbasat 2004; Lee 2006.)

Blascovich and Bailenson (2011) explored person–to–avatar interactions in experimental settings and, like those studying robots, find similarly meaningful interactions. These human–avatar interactions have a distinctly social nature, with human emotional and instrumental reactions to avatars mirroring human reactions to other humans. While it is too soon to predict the number of people likely to encounter or embrace avatars as a routine part of their daily lives, these findings suggest that those who interact with avatars may well be expanding their social circles in significant ways.

Of course, NCT provide other avenues for human–non–human interactions. Some contend that new technologies are challenging the spatial and temporal boundaries of social interaction. In so doing, these technologies allow entities that reside in memories, projections, and imaginings – humans and non-humans alike – to become legitimate participants in social exchange. Cerulo and Ruane (1997), for example, suggest that blurring temporal boundaries facilitates a new form of interaction called 'technosynchronicity'. Building on Schutz's (1951) concept of synchronicity, the authors argue that NCT afford more than a shared focus or a merging of the minds. Rather, these technologies make it possible to take what Kant (1957[1929]) referred to as an 'an internal intuition' and reproduce it in the empirical world of shared, sensory experience. In this way, persons, objects, and events once confined to the life of an individual's mental 'eye' can now be projected to others in a way that surpasses mere description. Technology apprehends elements of historical memory or future imagining and recreates them in a publicly accessible space.

The authors offer several examples of technosynchronicity. In architectural design, for instance, new technologies allow clients to experience an architect's ideas before builders execute the plans. Using a special apparatus, one can 'walk through' a design for a kitchen or office and actually sense the location and interact within it before it achieves material existence. Cerulo and Ruane contend that this experience allows architect and client to merge intuitions of the future with present experience, to bring the architect's imaginings directly to the consumer in a jointly accessible field of social interaction. In a more abstract example, the authors explore the ways in which new medical technologies can synchronize one body's future with another body's present, facilitating interactions that transcend temporal planes. Stem cell transplants, for instance, transport 'young' cells to an aged body. As such, the young cells live out their life in the confines of the 'home' body's timeframe. Similarly, organ transplants allow the body of one individual to live on through another individual's system. Thinking of such present/future mergers as social interactions may seem surreal at first glance. Yet Cerulo and Ruane argue that the heated moral debate surrounding such phenomena signal an increasingly common perception: such mergers represent social interactions between two distinct entities. (See also Bickle 1997; Chayko 2002; Isaacson 2002.)

Conclusion

Do non–humans count in social interaction? The answer is clearly complex. Historically, non–humans have flowed in and out of the interaction frame, and their role in interaction has been variably defined. But at the present, we occupy a sociocultural place and time when non–humans' are viewed as quite central to the process … and quite equal to humans in their legitimacy. Moreover, for the first time, social scientists are seriously investigating the phenomenon.

We have learned much about the scope of non–humans in interaction and we are in the process of exploring how such relationships are formed. But an important question remains. Why? Why are we including animals, deities, the dead, computers, robots, and avatars in our social circles? Is it the growing capabilities provided by rapid technological development? Are increased social and economic uncertainties prodding us to reach for new sources of comfort and connections? Are we losing our ties to more 'traditional' social actors? Or are we simply experiencing a prolonged cultural fad? Researchers do not have the answers to these questions yet. But the issues are worthy of our study.

Short Biography

Karen A. Cerulo (PhD, Princeton University) is Professor of Sociology at Rutgers University. Her research interests include culture and cognition, symbolic communication, media and technology, and comparative historical studies. Professor Cerulo's articles appear in a wide variety of journals, including the *American Sociological Review, Contemporary Sociology, Poetics, Social Forces, Sociological Forum, Sociological Inquiry, Communication Research* and annuals such as the *Annual Review of Sociology* and *Research in Political Sociology*. She is the author of three books: *Identity Designs: The Sights and Sounds of a Nation,* a work that won the ASA Culture Section's award for the Best Book of 1996 (Rose Book Series of the ASA, Rutgers University Press); *Deciphering Violence: The Cognitive Structure of Right and Wrong* (Routledge); and *Never Saw It Coming: Cultural Challenges to Envisioning the Worst* (University of Chicago Press) and the co-author of *Second Thoughts: Sociology Challenges Conventional Wisdom* (Pine Forge Press). She has also edited a collection entitled *Culture in Mind: Toward a Sociology of Culture and Cognition* (Routledge). Currently, she is at work on a book entitled *American Dreams: The Sociocultural Dimensions of Personal Aspirations*. Professor Cerulo's teaching earned her the Rutgers University Award for Distinguished Contributions to Undergraduate Education. Professor of Sociology and Department Chair, teaches courses in culture, media, social interaction, social deviance, and statistics.

Notes

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[1] A broader, more technical review of this and similar literature can be found in (Cerulo 2009).
[2] Cohen (1989) set the groundwork for such thinking.

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